CLAIMS

What is claimed is:

1. A method of maintaining a directory for a data container comprising:

determining that a sparse directory structure is to be changed; and

reconstructing said sparse directory structure into a fully populated directory structure.

2. The method of claim 1 further comprising:

determining that said fully populated directory structure is to be changed; and

reconstructing said fully populated directory structure into a sparsely populated directory structure.

3. The method of claim 1 wherein said sparse directory structure comprises:

a plurality of first directory entries comprising an address to one of said addressable spaces, a descriptor, and at least one link, said link being a pointer to a different of said directory entries;

at least one bottom level list comprising at least one of said plurality of first directory entries;

at least one top level entry for each of said bottom level lists; and

a top level list comprising said top level entries.

4. The method of claim 3 wherein said top level list is a skip list.

5. The method of claim 3 wherein said top level list is a linked list.

6. The method of claim 3 wherein said top level list is a doubly linked list.

7. The method of claim 3 wherein said top level list is an ordered array.

8. The method of claim 3 wherein said bottom level lists are skip lists.

9. The method of claim 3 wherein said bottom level lists are linked lists.

10. The method of claim 3 wherein said bottom level lists are doubly linked lists.

11. The method of claim 3 wherein said bottom level lists are ordered arrays.

12. A method of creating a directory for a sparsely filled data container comprising:

defining a data container;

creating a first directory entry comprising a first address, and a first forward link;

creating a second directory entry comprising a second address, and a second forward link;

determining that said second directory entry is located after said first directory entry in said data container;

defining said first forward link to link to said second directory entry;

creating a bottom level list that comprises said first directory entry and said second directory entry;

creating a top level entry that comprises a link to said bottom level list, a lower range, and an upper range;

analyzing said bottom level list to determine said lower range and said upper range of said top level entry; and

creating a top level directory that comprises said top level entry.

13. The method of claim 12 wherein said first directory entry comprises a first backward link and said second directory comprises a second backward link, the method further comprising:

determining that said first directory entry is located before said second directory entry in said data container; and

defining said second backward link to link to said first directory entry.

14. The method of claim 12 further comprising:

creating a third directory entry comprising a third address, and a third forward link, said third address being between said first directory entry and said second directory entry; and

adding said third directory entry by the method comprising:

adding said third directory entry to said bottom level list;

determining that said third directory entry is located between said first directory entry and said second directory entry;

changing said first forward link to link to said third directory entry; and

defining said third forward link to link to said second directory entry.

15. The method of claim 13 further comprising:

creating a third directory entry comprising a third address, a third forward link, and a third backward link, said third address being between said first directory entry and said second directory entry; and

adding said third directory entry by the method comprising:

adding said third directory entry to said bottom level list;

determining that said third directory entry is located between said first directory entry and said second directory entry;

changing said first forward link to link to said third directory entry;

defining said third forward link to link to said second directory entry;

changing said second backward link to link to said third directory entry; and

defining said third backward link to link to said first directory entry.

16. A data storage system comprising:

a data storage container; and

a controller that defines a sparse directory structure for said data container, determines that said sparse directory structure is to be changed, and reconstructs said sparse directory structure into a fully populated directory structure.

17. The data storage system of claim 16 wherein said sparse directory structure comprises:

a plurality of first directory entries comprising an address to one of said addressable spaces, a descriptor, and at least one link, said link being a pointer to a different of said directory entries;

at least one bottom level list comprising at least one of said plurality of first directory entries;

at least one top level entry for each of said bottom level lists; and

a top level list comprising said top level entries.

18. The data storage system of claim 17 wherein said bottom level list is a skip list.

19. The data storage system of claim 17 wherein said bottom level list is a linked list.

20. The data storage system of claim 17 wherein said bottom level list is a doubly linked list.

21. The data storage system of claim 17 wherein said bottom level list is an ordered array.

22. The data storage system of claim 17 wherein said top level list is a skip list.

23. The data storage system of claim 17 wherein said top level list is a linked list.

24. The data storage system of claim 17 wherein said top level list is a doubly linked list.

25. The data storage system of claim 17 wherein said top level list is an ordered array.